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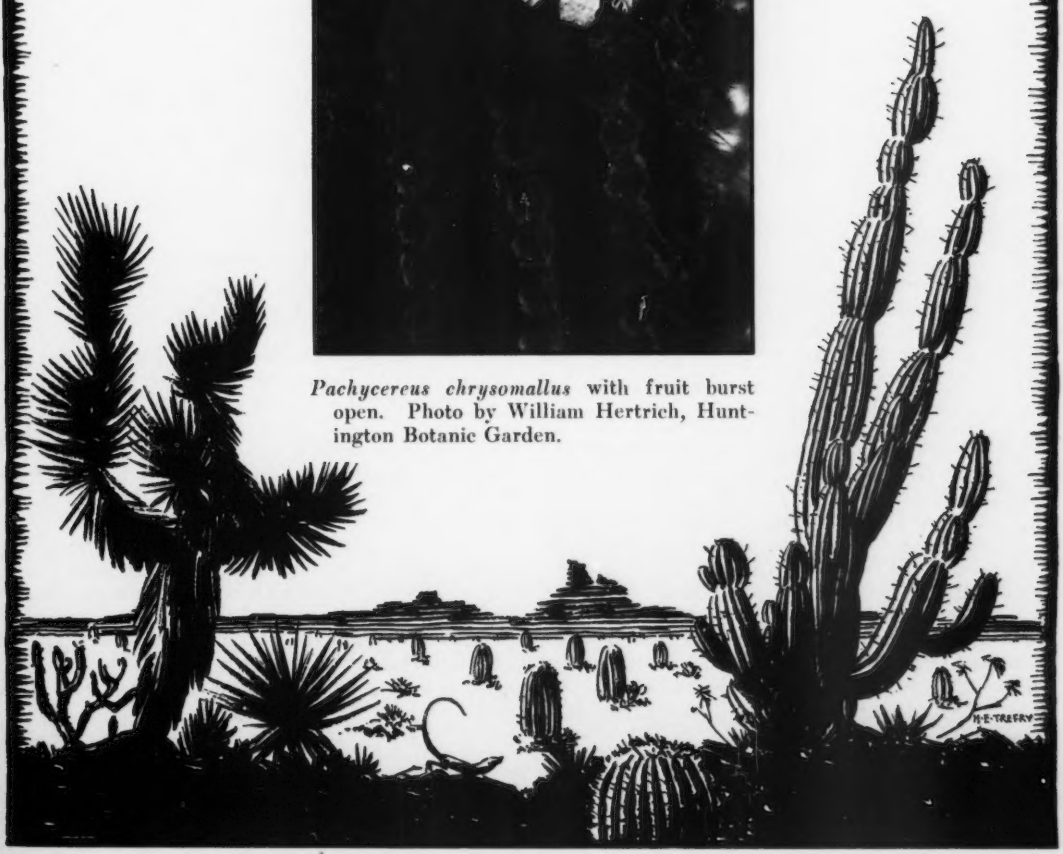
CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society Of America

VOL. VI OCTOBER, 1934 No. 4

Pachycereus chrysomallus with fruit burst open. Photo by William Hertrich, Huntington Botanic Garden.



CACTUS AND SUCCULENT JOURNAL
Published and Owned by

The Cactus and Succulent Society of America, 6162 N. Figueroa St., Los Angeles, California (Mail Address Only.) A monthly magazine to promote the Society and devoted to Cacti and Succulents for the dissemination of knowledge and the recording of hitherto unpublished data in order that the culture and study of these particular plants may attain the popularity which is justly theirs. "The Cactaceae," by N. L. Britton and J. N. Rose, has been adopted by this journal for purposes of identification. (Membership and subscription $3.00 per year, foreign $3.00 per year by International money order.) Mail membership application to the Society at 6162 N. Figueroa Street, Los Angeles, Calif. ($3.00 MUST accompany the application.) *Managing Editor,* Scott Haselton, 6162 N. Figueroa St., Los Angeles, Calif.; *Assistant Editor and Chairman Membership Committee,* Mrs. H. Weston; *Editorial Staff,* James West, 745 Fifth Ave., San Rafael, Calif.; Eric Walter, 2667 McAllister St., San Francisco, Calif.; Edgar M. Baxter, Bellflower, Calif.; Clarence Clum, 2443 Echo Park Ave., Los Angeles, Calif.

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New in the Huntington Botanic Garden
Fruit of *Pachycereus chrysomallus*

By William Hertrich

Pursuant to the article on *Pachycereus chrysomallus* appearing in the September issue (Vol. VI, No. 3, pg. 35) of the Cactus and Succulent Journal, the following addition may be of interest to the many readers of this Magazine.

Photos of the open and closed flowers were taken of *Pachycereus chrysomallus* at the Huntington Botanic Garden, on August 26th. The accompanying photo of the same plant was taken September 22nd—exactly 27 days later—and illustrates a mature fruit burst open displaying about 100 fully developed seeds. It is of great interest to many of us studying various phases of seed production to note the time it takes for the seed to mature following the opening and pollination of the flower. Nature seems to have reason for ripening, displaying and scattering the seeds of certain members of the Cactus family considerably faster than in others, for in some of the *Neomammillarias* many months elapse between the flowering and the scattering of the seed.

The above mentioned flower was hand pollinated with its own pollen. The stigma lobes projected far enough above the anthers to escape pollination by bees, since the wide open rim of the flower, measuring about three inches across, makes it easy for bees to get access to the nectar chamber on the base of the tube of the flower without coming in contact with the stigma lobes. Furthermore the stigma lobes were folded tight by daylight when the bees appeared for their early morning's work. In its native habitat I presume pollination is accomplished largely by night flying moths, which is the case with most night flowering species of similar flower construction.

New Garden Species, III

By R. W. Poindexter

Photo by Poindexter.

Left: A rooted cutting, actual size, of *Mesembryanthemum hybrid schickii* Hort.
Right: *Showing plant habit x 0.25*

MESEMBRYANTHEUM HYBRID SCHICKII—Hort.
A. C. S. No. 2-900-001

Originator: Morris Schick, 1931
Parentage: *Glottiphyllum linguiforme (Mesembryanthemum linguiforme)* (seed parent) x *Echinus echinatus (Mesembryanthemum echinatum)*

Plant branching freely and forming a low mound, 50 cm. or more in diam. Stems weak, terete, 5 mm. in diam., in age covered with thin, light brown bark; immature stems flattened on one side and bearing vesicles and bristles on the flattened side only. Leaves falcate, yellow green to bright green, shining, 4 cm. long, 1 cm. wide, 6 mm. thick, shallowly concave above, keeled below, bearing vesicles throughout, each vesicle surmounted by one white bristle 1 mm. long except those vesicles on the concave surface, which are naked. Pedicels conical, tapering downward, 15 mm. long. Sepals 5, fleshy, triangular in cross section, tapering to points, very unequal in length, the longest 15 mm. Pedicels, ovaries and sepals covered with vesicles and bristles like those of the leaves. Perianth rather irregular, petals narrow, strap-shaped, light yellow, 10 mm. long. Stamens numerous, anthers yellow. Stigma divisions 6 or 7. Flowers sterile.

This plant is named for Mr. Morris Schick, of Glendale, California, in whose gardens its seed was produced on a plant of *Glottiphyllum linguiforme*. Beside the *Glottiphyllum* was growing a specimen of *Echinus echinatus*, and the strong *echinatus* characteristics of the progeny show conclusively that this was the male parent.

Of some 300 seedlings grown by the author from this seed, all were normal *Glottiphyllum linguiforme* except two plants of this hybrid. One of these died. Other plants of this same parentage and of nearly identical character have been called to my attention by Mr. Krejci.

Although *Mesembryanthemum schickii* pro-

pagates easily, grows well and blooms almost continuously, it is not particularly recommended as a garden subject on account of its inconspicuous flowers. It is here described rather on account of its interest to students of heredity and of taxonomy. The interbreeding of these two species, not only once but several times, points to a fairly close relationship, in spite of their apparent dissimilarity. It indicates that a certain amount of biological study of the relationships existing between the various species of the genus *Mesembryanthemum*, as originally set up, might have been desirable before dividing it into a rather unwieldly number of new genera on the basis of external appearance only.

PRESIDENT'S COLUMN

By Charles Gibbs Adams, *President*

A new and powerful alliance has been consummated.

Your President had the honor to be the guest of the San Gabriel Valley Cactus and Succulent Club at their September meeting, which took the form of a delightful outdoor supper presided over by the President, Mrs. S. S. Aschenbrenner, in the embowered, palm-*thatched picnic ramada on the hilltop, in the* grounds of the Los Angeles County Fair at Pomona.

It was gratifying that that large and enthusiastic club of many good works, (which, by the way, had just won first prize over all *the many exhibits of cacti and other succulents* in that most extensive annual fair in the Country) voted to join the Cactus and Succulent Society of America, as an affiliated Club. As was recently the case with the Long Beach Club, not one dissenting vote was cast.

All other prizes in the fair, under such classification, by the way, were won by members of the Society, or of the above Club.

Now then, bring on those other candidates for affiliation, with local identity and meetings. We hear promises (or rumors, at least), from Santa Monica and Santa Barbara in California and from clubs in such widely separated states as Texas, New Jersey and Illinois. Affiliation means no loss of identity to the local club, lower subscription rate to the Cactus Journal, and greater power to the Mother Society. It also often means a welcome to fine gardens and collections closed to non-members.

Your President, in this connection, tenders the most earnest apology to the San Fernando Valley Cactus Club. He was well meaning, of course, but careless in saying recently in his column that the Long Beach Club was the first affiliate. He meant, of course, the first to come in under the new amendment, as published in the April Journal. The San Fernando Club had been a most highly valued affiliate for a long period of splendid service.

In fact, the national President Emeritus, Dr. Arthur D. Houghton, is of that Club, as is national Director Fred Benedict, Chairman Kelly of the Auditing Committee, Chairwoman Mrs. Warner of the Hospitality Committee, and many another splendid national worker for the cause. Who, then, *could* slight a club of such a record?

At the Long Beach Flower Show the Society won a blue ribbon for a collection of cacti and other succulents from the collections of R. W. Poindexter, your President, and the newly appointed Show Chairman, *Mr. Carl Seelbach, with Mrs. Harold Weston* as hostess. Yale Dawson took first on best display of cacti and succulents, open division. Best collection of cacti, open, went to Grejalva, Dawson second, Gates third. Gates took first on best collection of succulents. *In the open, Dawson took first for rarest* cactus with *Brachycereus thouarsii*, and So. Cal. Cactus Exchange second with a *Stromboca*ctus *disciformis* belonging to Marshall. In the amateur division Don Skinner took best individual succulent and rarest succulent, *both Echeverias. Dawson took the* first in best individual cactus (open) with a Pringlei crest, and Gates second with a *Machaerocereus eruca*. Gates got rarest succulent with *Agave margaritae* and Dawson best succulent with an *Idria columnaris*. One third of the show was composed of cactus and succulent entries with Long Beach Cactus Club, and the affiliated Long Beach Cactus and Succulent Society well represented. Olsen of Tucson staged an imposing desert landscape. Judges were E. O. Orpet, R. S. McGaughey, J. R. Brown and Morris Schick.

Arrangements are being consummated for a display in the famous Fall Flower Show of Pasadena. Such exhibitions have been found a powerful magnet for new memberships.

Cactus and succulent enthusiasts desiring to revive local meetings or study groups should communicate with M. L. Lernik, 1239-60 Avenue, Oakland, Calif.

Echeveria Hybrids

A. With *Pachyphytum*

By ERIC WALTHER

Editor's Note: We are especially glad to publish this article on Pachyveria since it represents the scientific work being completed by the author on his Echeveria monograph. Having recently pursued his studies in the East, Mr. Walther has only to complete his investigations in Mexico and then his work will be ready for publication. His excellent photographs and wealth of new material will make this contribution of inestimable value to science.

Our attitude towards hybrids is bound to differ, according to our viewpoint, whether it is that of the systematist in search of data permitting a more orderly arrangement and more logical classification, or that of the gardener looking for more and better plants for his own purposes. Hybrids are admittedly disturbing to dogmatic concepts of both generic and specific limits; and the time when they were literally anathema to many closet-botanists is not so long ago. Since plant-breeding has matured into the science of Genetics, hybrids too are coming to be treated with more respect, and if of definitely known parentage are often capable of throwing much light on obscure questions of origin and relationships.

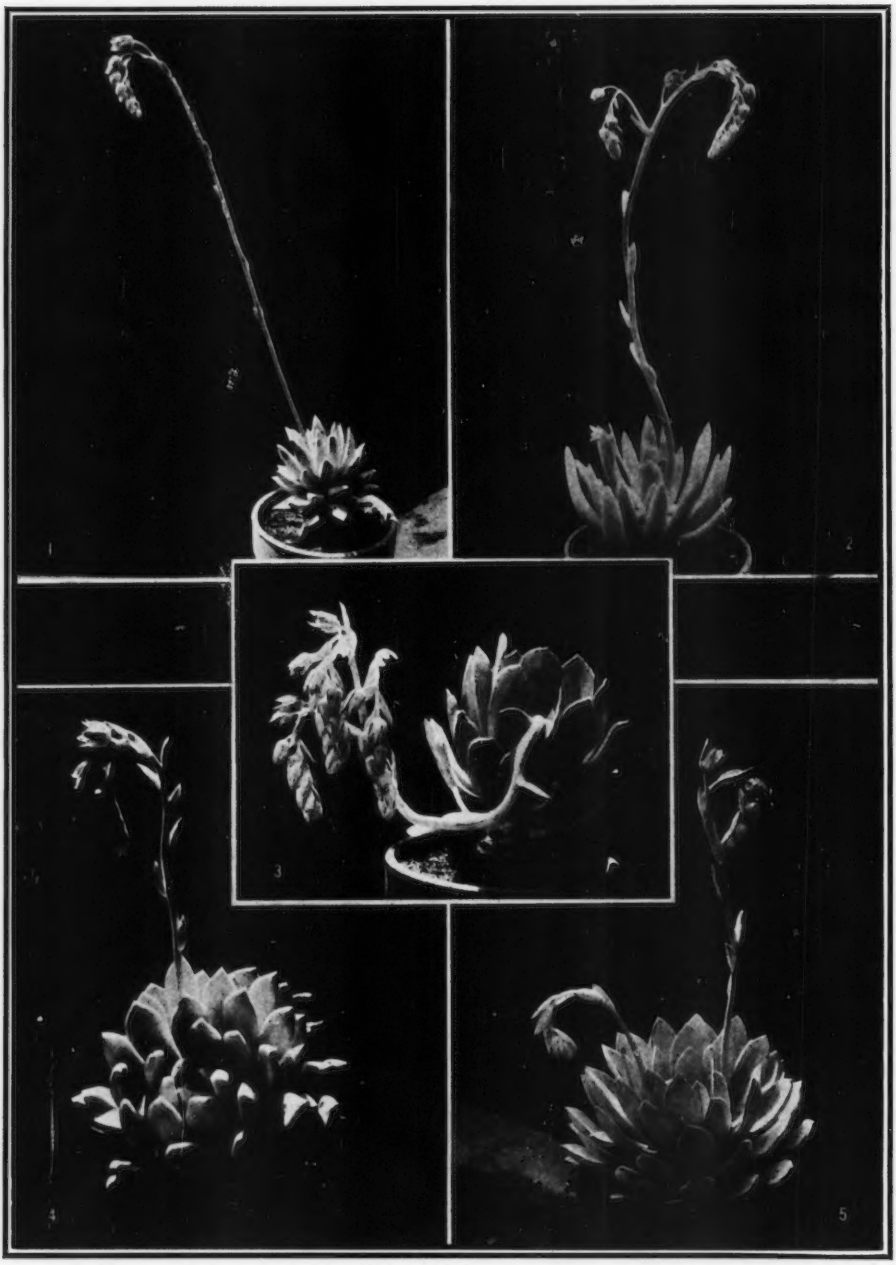
In the *Crassulaceae*, the subfamily *Echeverioideae* is, in striking contrast with the *Sedoideae* and *Crassuloideae*, very prone to hybridization, both inter-specifically and inter-generically, agreeing in this respect with the *Sempervivoideae*. Whether it is permissible to draw any conclusions from the available, superficial observations or not, it may still be pointed out that the first-mentioned two subfamilies are concededly the older ones. Their consequent greater age makes for a much intensified force of heredity, followed by a relative scarcity of natural hybrids. The subfamily *Echeverioideae*, including both *Echeveria* and *Pachyphytum*, is undoubtedly of much more recent origin, being a comparatively late off-shoot of the New-World representatives of the cosmopolitan *Sedoideae*. Just what role has been played in this development by hybridization no one knows, but this may well have been much more important than formerly suspected.

However, if a difference in the facility with which the various groups, subgroups and species intercross is indicative of a corresponding difference in the degree of consanguinity, then *Echeveria* should be related much more closely to both *Pachyphytum* and *Graptopetalum* than to either *Dudleya, Stylophyllum* or *Sedum* proper. Even if several crosses between *Echeveria* and *Dudleya* are reported, no authentically established case is known to the present writer; and this scarcity of hybrids between the two genera seems to confirm very strongly our separation of the two. On the same basis one might argue for the merger of the genera *Echeveria, Graptopetalum* and *Pachyphytum*, were it not for the existence of abundant morphological differences quite adequate for their separation.

It logically follows that the existing bi-generic hybrids require separate treatment and a distinctive name, so that no further justification is needed here for adopting the name "Pachyveria" for all hybrids between *Echeveria* and *Pachyphytum*. This was first used by the well-known firm Haage & Schmidt in one of their last published catalogs, and may here be legitimized (*1.)

Evidently *Pachyphytum bracteosum* I.KO. has been most prolific in the production of these hybrids. From the very real difficulty experienced in rearing any plants true to name from seed of *P. bracteosum* collected in our local gardens, we must conclude that proterandry, the mechanism designed to prevent self-fertilization, is most effective here. Proterandry is a term applied to cases of flowers ripening the pollen, and shedding most of this, before the stigma becomes receptive.

It may be urged that such readiness to cross implies very close relationship, too close for retention as separate genera. No final decision will be possible at present, the question requires much more study, both in the field, where natural hybrids may yet be found, too, and in the laboratory, where cytological and anatomical facts bearing on the matter may soon be forthcoming. Morphological characters, of presumably only slight import because of their external and superficial nature, assume a deeper significance when we find them transmitted to hybrid-offspring, apparently as true dominants, to over 10 cases out of 15 observed.



1. *Pachyveria glauca* H. & S. ..... app. x 0.25
2. *Pachyveria sobrina* (Berg.) EW. ..... app. x 0.3
3. *Pachyveria sodalis* (Berg.) EW. ..... app. x 0.3
4. *Pachyveria scheideckeri* (de Smet) EW. app. x 0.4
5. *Pachyveria mirabilis* (Deleuil) EW. app. x 0.3

All photos by Eric Walther of plants in collection of V. Reiter, Jr.

Only an emphatically distinct gene-constitution could account for the obvious facts.

Singly or in combination, the various characters typical of *Pachyphytum,* as greatly enlarged and appressed sepals, petal-appendages, or conspicuously thickened leaves, almost inevitably are present in at least the F1-generation. Transmitted almost as regularly are the thick, flask-shaped carpels with the thick, obliquely-truncate honey-glands.

Echeveria shows its influence in the usually more numerous leaves, more abundant offsets, frequently branched inflorescence, and less prominent bracts.

Culturally, these hybrids do not differ materially in their requirements from *Echeveria* or *Pachyphytum.* On the whole they seem to be no more frost-proof than *P. bracteosum,* so that out-of-door culture is attended by risks wherever the minimum-temperature of winter drops below the freezing-point. Further purposeful hybridization between the two genera may well yield more fine things, but we would like to caution against the indiscriminate raising of nondescript hybrids, when with just a little more care, such as bagging the flowers, we can make definitely certain of both parents. The truly able plant-breeder at no time shows his superior knowledge and skill to better advantage than when destroying, courageously and ruthlessly, 99% of his precious seedlings, preserving only those representing a real and worthwhile advance.

Some of these hybrids were raised over 50 years ago in Europe, by Deleuil, De Smet and others; and some of our garden-plants are traceable to those days. Of recent times a large number have been distributed by our friend E. O. Orpet of Santa Barbara, raised by him, largely from *Pachyphytum bracteosum,* which parent also entered into several crosses made by V. Reiter, Jr. of San Francisco. The writer would welcome any information on additional plants of *Pachyveria,* further observed facts, etc.

Several other plants are grown locally, undoubtedly owing their origin to the accidental or intentional crossing of these two genera, but either differ only slightly from those enumerated here, or are of uncertain origin, often showing few or no evidence of bigeneric character. They are therefore omitted for the present.

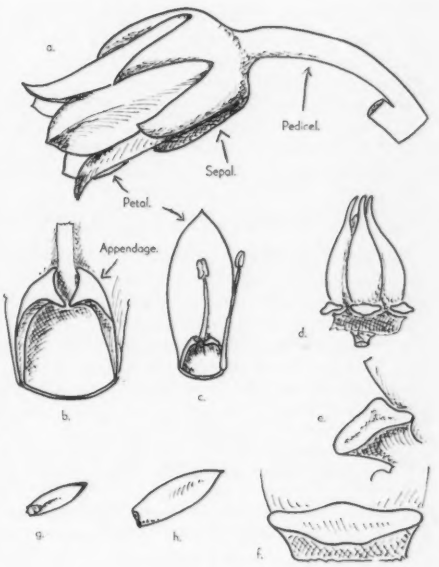


Fig. 6 *Pachyveria glauca* H. & S.

	App. x.
a. Side-view of flower	x 2
b. Base of petal with appendages, honey-cavity	x 8
c. Inner surface of petal, with stamens	x 2
d. Carpels	x 2
e. Side-view of honeygland	x 8
f. Front-view of honeygland	x 8
g. Bract of flowering-stem	x 0.4
h. Leaf	x 0.4

List of hybrids and parents:

PACHYVERIA H. & S.

bergeriana H. ..... *P. sodalis* (Berg.) EW.
clavata EW. ..... (*P. bracteosum* x E. sp. ?)
clavifolia (Berg.) ..... (the true plant not grown here.)
clavifolia (Hort) ..... *clavata* EW.
clavifolia var. cristata H. ..... *P. clavata* var. *cristata* EW.
Clevelandii H. ..... (*P. bracteosum* x *E. secunda ?*)
E. O. ORPET. EW. ..... (*P. bracteosum* x E. sp. ?)
glauca Haage & Schmidt ..... (P. hookeri x E. sp. ?)
LA ROCHETTE No. 1 EW. ..... (*P. bracteosum* x E. FLAMMEA ?)
mirabilis (Deleuil) EW. ..... (*P. bracteosum* x E. scheerii H. ?)
morreniana Deleuil ..... (*P. bracteosum x E. peacockii*)
MRS. SCANNAVINO EW. ..... (P. bracteosum x E. sp. ?)
pachyphytoides (de Smet) Berg. ..... (*P. bracteosum* x *E. metallica*)
scheideckeri (de Smet) EW. ..... (*P. bracteosum* x *E. secunda*)
var. **albo-carinata** EW. ..... (E. albo-carinata Hort.)
sobrina (Berg.) EW. (Syn. E. fusifera H.) ..... (*P. hookeri* x E. sp. ?)
sodalis (Berg.) EW. (Syn. E bergeriana H.) ..... (*P. bracteosum* x E. sp.?
spathulata Ed. Morren ..... (*P. bracteosum* x. E. grandifolia H.)

KEY TO PACHYVERIA (*1) AND PACHYPHYTUM, as grown here:

1a. Petals appendaged at filament-base 2
- b. Petals without appendages within 16

2a. Sepals widely spreading ..... *(Pachyphytum chloranthum)*
- b. Sepals more or less appressed to corolla 3

3a. Sepals large, broad, as long as corrolla; leaves flattened 4
- b. Sepals smaller, shorter than corolla; leaves subterete 11

4a. Sepals broad, obtuse, widest above middle 5
- b. Sepals narrower, more pointed 7

5a. Leaves less than twice as long as broad, convex above; flowers few ..... *(Pachyphytum oviferum)*
- b. Leaves narrower, above flat or concave; flowers many 6

6a. Leaves grey, blunt; flowers 10-18 ..... *(Pachyphytum bracteosum)*
- b. Leaves tinged red, acute; flowers 6 to 8 ..... *(Pachyphytum longifolium)*

7a. (4b) Panicle trailing ..... **Pachyveria sodalis** (Berg.) EW.
- b. Inflorescence erect, often simpler, racemose 8

8a. Pedicels short; flowers crowded 9
- b. Pedicels slender, flowers not crowded 10

9a. Leaves grey, broadest near middle; raceme mostly bifid (Not P. clavifolia Berg.) ..... **Pachyveria clavata EW.**
a. Stem fasciated, leaves small, crowded ..... var. **cristata** Hort.
- b. Leaves tinged purple, broadest above middle; raceme mostly 3-branched ..... **Pachyveria pachyphytoides** (de Smet) Berg.

10a. (8b) Leaves narrow;sepals appressed ..... **Pachyveria mirabilis** (Deleuil) EW.
- b. Leaves broader, 3 by 6"; sepals spreading at anthesis ..... **Pachyveria "E. O. ORPET"** EW.

11a. (3b) Stem sticky; leaves broad, to 1" wide or more ..... *(Pachyphytum brevifolium)*
- b. Stem not so; leaves narrower, terete or nearly so 12

12a. Leaves closely crowded, angled from mutual pressure 13
- b. Leaves subdistant, scarcely angled 14

13a. Petal-tips recurved; leaves to 2" long, slightly flattened above, grey ..... **Pachyveria glauca** Haage & Schmidt
- b. Petals erect; leaves 1" long or less, angular-terete ..... *(Pachyphytum compactum)*
a. Leaves tinged purple; corolla pale; sepals green ..... *(type)*
b. Leaves scarcely purplish; corolla, sepals and upper part of pedicel brilliant jasper-red ..... var. **weinbergii** EW. *new var.* (*2)

14a. (12b) Leaves short, green; flowers few ..... *(Pachyphytum uniflorum)*
- b. Leaves longer, grey or glaucous; flowers many 15

15a. Leaves broad, 2-3-times as long as wide; corolla 15 mm. long; sepals shorter (Syn. P. aduncum) *(Pachyphytum hookeri)*
- b. Leaves narrow, to 5-times as long as broad; corolla and sepals both 10 to 12 mm. long ..... **Pachyveria sobrina** (Berg.) EW.

16a. (1b) Sepals large, appressed or slightly spreading, like those typical of *Pachyphytum* 17
- b. Sepals similar to those of *Echeveria;* (Several garden-forms may belong here; but in absence of any records they can not properly be placed into *Pachyveria*..... (*3)

17a. Sepals closely appressed to corolla 18
- b. Sepals somewhat spreading or ascending 19

18a. Cespitose; stem short, leaves many, glaucous; sepals shorter than corolla ..... **Pachyveria scheideckeri** (de Smet) EW.
a. Leaves striped white ..... var. **albo-carinata** EW.
- b. Stem evident; leaves few, to 4" long, tinged red; sepals longer than corolla ..... **Pachyveria "LA ROCHETTE No. 1."** EW.

19a. (17b) Leaves narrow, tinged purple; sepals narrow. (Syn. E. nobilis H., E. magnifica H.)....**Pachyveria "CLEVELANDII."** (Hort.) EW
- b. Leaves broad, obovate, glaucous; sepals broadly ovate ..... **Pachyveria "MRS. SCANNAVINO."** EW.

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*1. PACHYVERIA H. & S.: *"Hybridae inter Pachyphytum et Echeveriam."* Name designed to apply to all hybrids between the genera *Pachyphytum* and *Echeveria.* Genotype: *P. pachyphytoides.*

*2. P. COMPACTUM VAR. WEINBERGII *Var. nov. "Simile ad typum, sed corolla calice et pedicellis rubrioribus."* We take pleasure in dedicating this variety to its introducer and regret that the known variability of *P. compactum* does not permit us to rank this form as a valid species.

*3 To be treated separately at a later date.

Genus Lithops, Part III

By F. Swuste, The Hague, Holland
Translated from the Dutch by E. J. Labarre, Amsterdam

THE CULTIVATION OF LITHOPS

Lithops are found in South Africa chiefly in the districts of Damaraland, Great and Little Namaqualand, Griqualand West, the Transvaal and in the Karroo from Laignsburg to Willowmore, but the centre of origin is probably South-West Africa.

Imported plants can be received in North Western Europe during the whole year. When the plants have been dug out with the roots entire, the further cultivation will present no difficulties, particularly if the roots still carry some of the original soil, mostly clay. If received during the spring or summer they should simply be placed in their definite mixture of soil and treated as plants which have been in cultivation a long time.

If the roots are destroyed or damaged, these should first be removed and the plants then potted in fine sand kept moderately moist and placed in a warm spot. Good light is always imperative. If the plants have rooted, then the water supply is reduced and the plants are treated as normal growths. Transplantation can always take place in the spring and summer. Although therefore there is no objection, with a view to further cultivation, to receiving plants at any period of the year, it is on the other hand of great importance that one should only import growths which have properly matured in their native climate and consequently have reached a condition of rest. If we take this into consideration, the most suitable period will be the months of March and April, preferably not earlier in the year because of the risk of frost during transit. If the specimens have several growths these should, if possible, be kept intact. If we wish to take cuttings this should only be done after the plants have entirely recovered; these cuttings must be taken off the plant as close to the point of junction as possible, as otherwise we run the risk of damaging the growing point, which lies very low and close to the root. The scar produced by cutting off these growths should first be allowed to dry for a few days and the plant then potted in fine moist sand. Never cut in autumn and winter, for although these plants are at this time in full growth in their native country, it is summer season there, and the propagation by cuttings in winter in Europe would only result in disappointment.

The number of Lithops species known up to the present day is about 50. I can heartily recommend them to any one who has not yet made the acquaintance of these plants, for they are plant forms of such charm and attraction that we are constantly being fascinated by them.

One of the first to flower is the well-known *Lithops pseudotruncatella,* and then *Lithops rugosa* and *Lithops alpina.* These show their buds about June 20. The other species flower later, usually in the months of September and November, while the *Lithops marmorata,* and *L. vallis mariae,* both specimens of 5 growths each, have not yet flowered in my collection. I should say that in their habitat they probably flower late and that owing to the smaller amount of light available at that time in North-Western Europe, the heat and light is insufficient to produce the flowers. A Lithops of flowering strength averages 5 years old, although I have a few species (*Lithops herrei, Lithops floris albis, Lithops kiubisensis*) which have flowered in their third year. In various works on succulents published on the continent it is stated that *L. pseudotruncatella* will only flower when the fissure runs right across the growth; this is an error for these plants also flower in their younger stage, before the fissure has extended right across.

Although all species of Lithops require the same treatment, some are stronger than others. As a rule it may be said that the pale colored ones are more sensitive than the darker ones, although there are exceptions to this. *Lithops eberlanzii* and *L. fransisci* are somewhat difficult. *Lithops bella* and *L. lesliei* are strong plants, which are fond of water during the summer.

The period of watering should be regulated as follows: The old pair of leaves should be entirely consumed or absorbed by the new growth, that is, the young pair of leaves should grow at the expense of the old until the latter is reduced to thin, dry skin. Then give plenty of water, but not before,

because before this time there are no capillary roots and the plant cannot absorb water. It is not natural for a Lithops to have more than its single pair of new leaves at the same time.

Here in Europe this question has not been given sufficient attention; one need not fear that a Lithops will dry up or die off under this treatment. In South Africa, where the sunlight is far more intense than in Europe and where during the dry period, which usually lasts eight months and sometimes 20 months, not a single drop of rain falls, these plants thrive very well. We must also give the plants this dry treatment in order to avoid degeneration during the growing period in the summer, in fact during the whole year we must admit as much sunlight as possible, in which case we need not during the growing period be too chary with water. The water should penetrate readily through the soil and not be retained in the pot. From October 16th to the first of March we place the Lithops in a cool and dry position without a single drop of water and during this time cool and fresh air is essential for their health and strength.

The epidermis or outer skin is, under cultivation in the moist climate of Europe, much softer than in the native habitat. There Lithops grow concealed in the soil and only the flat tops of the growths are visible, a condition which serves to prevent evaporation. In Europe the plants should not be placed in the soil deeper than at the line between the root and the growth; in their natural state the skins of the old leaves remain fixed at this point and thus protect the growth against evaporation. Under cultivation here, however, the old skins should be removed *if they are entirely dried up,* for they would only absorb moisture from the air and give rise to rot in the new growth. In their native soil it does not matter if a shower of rain passes over the plants, but here we take care that the growths should not be touched by water and, above all, that water is not allowed to remain in the fissure. It should be remembered that the neck or mark between the root and growth is the most sensitive part of these plants.

Lithops can be placed outside during the summer, under a pane of glass for instance, as this will make the skin stronger and more resistant, but the flower will be delayed or may not appear at all.

The best place to keep them is in the greenhouse, not too close to horizontal or oblique panes, for a Lithops can also be burnt, but otherwise they should be given as much sun and fresh air as possible.

A rot disease will easily appear at the neck, particularly in seedlings of one or two years old, but also in some of the older plants. The nature of this disease, which is probably an infection of the respiratory organs, has not yet been determined, nor the remedy found. Of late years, however, I have obtained much better results; the average mixture of soil used is one-half to one-third of coarse sand and the remainder loam with a little clay and old mortar-rubble. Instead of this old mortar-rubble, lime marl or chalk, or even crushed marble may be used, the latter being one of the fairly pure forms of carbonated lime (Ca CO 3). To this we may add a little fertilizer, not too much, only a teaspoonful in a 4 in. flowerpot. One should preferably not give any nitrogenous fertilizer at all. For the rest, one may very well omit any addition of fertilizer if the soil mixture is good enough. The addition of lime is always necessary but should not be overdone, and the soil should not look white. Lime prevents the soil from becoming sour and the absence of lime may produce toxic symptoms. *L. pseudotruncatella* and *L. bella* both grow on non-calcareous soil in their native habitat; they have not a salt taste and are eaten by the children who find them. The other Lithops are also edible.

After I had suffered for some time from the loss of Lithops seedlings owing to this rot disease I transferred the seedlings to a red clay soil instead of the grey alluvial clay. The red clay is formed by the presence of ferric oxyde, and any kind of red clay may be used. The clay should be tested for lime by dropping a few drops of hydrochloric acid or spirits of salts on it. If the soil effervesces, lime is present, and if not, lime must be added. We should then add one-half to one-third of coarse sand and a fertilizer or not, as stated above.

Most of my acquaintances who are also amateur growers of succulents find the watering of these plants a difficult proposition because the moist clay splits up after it has dried. This difficulty will be easily avoided if, at some distance from the plant itself, holes are made in the soil right down to the bottom of the pan, and the amount of water required is poured into these holes. The surface of the soil will then not crack and the plant above ground will remain dry. The results are amazing; no more rot, the plants are much

stronger and their flowering is much increased, nor is it necessary to water so much because the clay retains the moisture longer than the loam.

Some species of Lithops will in the course of years form large groups such as, for instance, *L. fransisci, L. vallis-mariae, L. olivacea,* etc. Others, like *L. alpina,* rarely form more than two growths. The normal increase takes place by doubling, that is to say two fresh pairs of leaves or two new growths appear from one old growth, though in many cases new shoots grow from the base, as I have observed in *L. fulleri* and *L. herrei.* In the last mentioned species it may be said that vegetative propagation may take place in two different ways in the same plant.

In conclusion I may say that only yellow and white flowers are known in the genus Lithops.

JOURNAL WILL REPRINT VOL. III

On January 1st the Journal will continue the reprinting of "The Cactaceae" by Britton and Rose. Volume three will be the most popular to reprint and this will be followed by Volumes II and IV. Through the help of one of our most loyal members we hope to be able to reprint 16 pages each month instead of the usual 8 pages; this would complete the next Volume within 18 months. This plan is only possible with Volume III since part of the "cuts" for Volume II were destroyed by fire while in the possession of Carnegie Institution.

Volume III includes many interesting genera some of which are: Echinocereus, Echinopsis, Ariocarpus, Lophophora, Echinofossulocactus, Ferocactus, Astrophytum, Malacocarpus, Sclerocactus, and 25 others. A great many of these plants are in most collections and this Volume should be of immediate value.

WHAT OTHERS SAY

I hope it will be decided to reprint the whole of Britton & Rose. The Opuntia volume is, after all, probably the least interesting from the standpoint of the ordinary collector. In fact, if further reprints are decided on, it might be worth considering whether the volumes dealing with the Echinocacti, Echinocerei, Neomammillarias and, generally, the smaller example, might not be the most welcome to the majority of your members.

G. R. L. P. (Canada.)

CLASS IN BOTANY

Dr. A. D. Houghton has consented to conduct a class in botany as applied to cacti and other succulents. This is a rare opportunity for those who desire the fundamentals in botany so that they can understand or describe a plant intelligently. Dr. Houghton needs no introduction and he welcomes you to the first class without charge. The class will be limited, and will meet at Abbey San Encino, 6162 N. Figueroa St. at 7:30, Monday, October 29th. Entrance at Arroyo Glen.

CACTI FOUND IN AND NEAR TUCSON, ARIZONA

In "Tucson," the official city and county magazine of March 1934, Vol. 7, No. 3 (Price 15c), Paul G. Olsen names the following cacti growing near Tucson:

Carnegiea gigantea (Giant Saguaro)
Coryphantha aggregata (Pincushion)
Coryphantha neo-mexicana (Pincushion)
Coryphantha recurvata (Devils Pincushion)
Coryphantha robustispina (Pineapple Cactus)
Coryphantha sulcata (Pineapple Cactus)
Echinocereus engelmannii (Hedgehog Cactus)
Enchinocereus fendleri (Hedgehog Cactus)
Echinocereus rigidissimus (Rainbow Cactus)
Echinomastus erectrocentrus
Ferocactus covillei (Barrel, Candy, or Spider Cactus)
Ferocactus lecontei (Old Niggers Head Cactus)
Ferocactus wislizenii (Candy Cactus)
Lemairocereus thurberi (Organ pipe Cactus)
Lophocereus schottii (Senita or Old Man)
Neomammillaria fasciculata (Pincushion)
Neomammillaria macdougalii (Cream or Pancake Cactus)
Neomammillaria mainae (Pincushion Cactus)
Neomammillaria microcarpa (Pincushion or Sunset Cactus)
Neomammillaria milleri (Black spined Pincushion)
Neomammillaria wilcoxia (Pincushion)
Opuntia santa rita (Prickly Pear)
Opuntia discata (Prickly Pear)
Opuntia delicata (Delicate Prickly Pear)
Opuntia phaeacantha (Brown spined Prickly Pear)
Opuntia engelmannii (White spined Prickly Pear)
Opuntia canada
Opuntia leptocaulis (Christmas Cactus)
Opuntia arbuscula (Tree Cactus)
Opuntia bigelovii (Teddy Bear or Jumping Cactus)
Opuntia versicolor (Cane, Cholla or Purple Cholla Cactus)
Opuntia spinosior (Cane Cactus)
Opuntia stanlyi (Creeping Cholla)
Peniocereus greggii (Night Blooming Cactus)

Grusonia santamaria, New Species

By E. M. Baxter

GRUSONIA SANTAMARIA, sp. nov.

Planta ramosa late, 5-6 dm. alta; articulis cylindratis 3-4 cm. diametro 3-4 dm. longis. 8-9 costatis per confluentiam angustorum tuberculorum; spinis circiter 20 diversis 8-12 mm. longis purpureis aliquot cum membranaceis vaginis; ramulis hornotinis ad basim ramorum annosorum divisis; petalis obovatis mucronatis circiter 20 mm. latis 25 mm. longis, petalis junioribus exterioribus rosantibus interioribus chloroticis rosantibus mediis stylo sesquilongioribus; stylo albo staminibus sesquilongiore; staminibus sesilibus; ovario circiter 20 mm. lato 25 mm. longo tuberculato sparse folioso 8-costato, areolis ovarii tomentosis spinosis, spinis centralis circiter 6-7 mm. longis radialibus 2-6 mm. longis; fructu ovato-truncato compresso lateraliter, umbilico depresso; seminibus ignotis.

Plants low, spreading, about 2 feet high. Joints cylindric, ribbed by confluence of its lengthened tubercles, 8 or 9 ribs arranged in a gradual spiral; joints 1½ inches in diameter by as large as 1½ feet in length. Ribs have tubercles about ½ inch apart carrying caducous glochids and many ⅜ to ½ inch plum colored spines. Occasionally a spine may have a very thin sheath on its upper half. Spines are spreading, none definitely central or radial, about 20.

New joints grow from near the base of the plant. Dead stems show the reticulated woody structure common to the Cylindropuntias and some of the Tephrocactus.

Outer perianth segments rose red, gradually more yellow (greenish-sulphur yellow) towards the inner rows of segments. There are four altogether, two definitely outer, and two inner. The inner petals have a rose-colored midvein. Petals are one inch long by ⅞ inch at the widest part, inverted pyriform, mucronate. The upper margin notched. Petals are 1½ times as long as the pistil.

Style white; stigma lobes six arranged in two opposite rows of three; filaments pale green; pistil 1½ times as long as stamens. Stigma lobes are pointed like leaves and are pubescent. Stamens are sensitive.

Ovary 1 inch long by ¾ inch wide; eight ribs formed by confluent tubercles. Areoles with leaf, wool, central glochid or bristly spines ¼ to ⅜ inch long, marginal bristles 1-16 to ¼ inch long; leaves ⅜ inch by 3-32 inch, green, rose-tipped.

The flower on the second day takes on a solid light rose color throughout. It is about ⅓ closed at end of second day. The rose color deepens on the third day. The flower becomes irregular, ⅔ closed, some petals open, some wilted, etc.

TYPE LOCALITY: Mesa at southern edge of Santa Maria Bay, Magdalena Island, Baja California.

DISTRIBUTION: Known only from the type locality.

TYPE SPECIMEN: No. 221, 465 in the Dudley Herbarium of Stanford University, California, collected by Howard E. Gates of Anaheim, who discovered the species on February 17, 1931.

Mr. Gates writes as follows about this species: (1932)

"The roots were fibrous and woody as with most chollas. The soil was gravelly. Not many plants were found and they were all rather sprawly. The dead wood was a netted cylinder. The stems were unusually heavy for a cholla. The spines are "barbed" and exceedingly sharp. It was a painful job to collect my specimens.

"There were no flowers or buds on the plants and the fruits were green. Note that the fruit are rather flatted, the umbilicus much depressed and the fruit strongly ribbed.

"One striking feature was the plum color of the spines. They are practically the same shade as *Cochemiea halei*. The new growth shows the spine clusters to grow on continuous ridges that are slightly tubercled. It was probably this that caused me to think that it was a new cereus when I first saw it."

His reference to *Cylindropuntia* was made before the relationship to *Grusonia* was thought possible. It is interesting to note that, the same as with *Grusonia bradtiana* when it was first described, first glance indicated a *Cereus (Echinocereus)* identification.

This species is the *Opuntia Santa-maria* mentioned in Volume IV, No. 5, page 283 of this JOURNAL. It is congeneric with *Grusonia bradtiana*.

This species was discovered on the shore of Santa Maria Bay on Magdalena Island, Baja California, by Howard E. Gates of Anaheim. He mentioned it and showed a picture in Volume III, No. 1, page 5 of this JOURNAL. The plant flowered for the first time June 18, 1934.

Different from *Grusonia bradtiana* with its long clear or white spines, this species has spines only half as long and red in color. Occasionally a very thin sheath may peel off the upper half of a spine.

Plants of this species grow taller than those of the other member of the genus, being often two feet high. Growth may continue for a second or third year from the tip of a branch but is more often from the base.

Flowers appear at the top end of the previous year's growth as in the other species of *Grusonia* and in the *Clavatae Series* of *Opuntia*, although the fruit is entirely different from those of the latter *Series*.

In the growth in cultivation the ribs are spiraled counter-clockwise while its natural growth spirals clock-wise. The ribs are formed through the confluence of the long, high, narrow tubercles.

FRICKS NOTES

Over a year ago it was announced in my notes (Vol. V, Page 426) that the German coal-tar dyes had been so well developed that the cochineal louse was passe as a source of coloring material. It was too slow, for it took seventy thousand insects to make one pound of cochineal color, and took one laborer one whole day to pick enough of these bugs from the cactus to make one ounce of dye. But every louse has his day. The German dye industry now complains that the cochineal louse is once more in high favor in the Canary Islands. At Las Palmas, in the Canaries, the prosperity of this village is based on this louse, which was imported from Mexico about one century ago. Its culture resulted in a scarlet dye that was exported in large quantities. When the Germans invented artificial aniline scarlet, it was found it could be made much cheaper than the cochineal, which was almost completely replaced by the new German dyestuff. At Las Palmas, many plantations were abandoned, but a few of the hard headed planters held their cactus acreage, believing that one day a need for their dye would come back. Then fashion decreed that our women folks should have red lips and cheeks. When a harmless coloring for rouge and lipstick was sought, someone remembered the old cochineal louse and now those who kept their plantations of cactus in the Canaries are reaping a reward, as the cochineal is extensively used in the cosmetic industry and has restored prosperity to Las Palmas.

* * *

Do any of you old timers remember when it was the smartest of smart things to do, to grow a "Rat Tail Cactus" *(Aporocactus flagelliformis)* in an old ox horn and hang it on a pillar of the front porch of your home as an ornament? And do you remember also how jealous you were of your neighbor who had a longer horn with more twists than yours?

FROM SANTA BARBARA

In regards to Frick Notes I wish to state that *Yucca whipplei* dies after flowering in this part of the country, but I do not know of any other Yucca that does.

UPSETTING THE BALANCE OF NATURE

The increasing number of deaths from the bite of the Black Widow spider has been erroneously ascribed to the prevalence of dry weather. This year is not particularly drier than preceding years so this does not account for the increase of this pest. The fact is that cleanliness is the cause. We have killed off too many of the natural enemies of the spider. The Mud-dauber Wasp has the peculiar ability of stinging the spider in one of its nervous ganglia which paralyses, but does not kill the spider. The paralysed spiders are taken to the wasps nest and stored for living food for the young wasps. As many as 100 of these spiders have been found in one wasps nest. This thought is germain to the cactus lover as these spiders are frequently found among our plants. The webs are very irregular and the fibres are among the toughest and stringiest. In killing them look out for they really jump. DR. A. D. HOUGHTON.

TRANSLATION AVAILABLE

"Brasilien und Seine Saulenkakteen" (Brazil and its Columnar Cacti) by Dr. E. Werdermann.

The book consists of a narrative of the author's trip through Brazil in quest of cacti, original descriptions of new species discovered, keys and descriptions of all the known columnar cacti of the region and many hints on collecting, packing and preserving specimens. It is a valuable addition to the literature which is all too limited for those who collect and study this plant family.

A review of this book was given in the February 1934 issue of this Journal accompanied by an Editor's note to the effect that an English translation was available to those interested. Several inquiries were received, but due to the cost of making typewritten copies of these none have been made as yet. It is not the intention of the writer to make a commercial venture of this translation, but since several members desire a copy the writer is willing to undertake the expense of mimeographing provided that a sufficient number of members will order. The job consists of about 75 typewritten pages. Those interested should write to R. W. Kelly, 638 W. Wilson Ave., Glendale, Calif., stating that they will pay $2.00 upon receipt of same. The work will be available as soon as enough inquiries are received to justify the expense.

QUESTION COLUMN

It was with great pleasure that I read Mr. Wood's article in answer to my inquiry in the July number of the Journal.

His reasons for accentuation of the different words was very instructive and interesting. But before I ask Mr. Woods some questions, I would like to correct a statement he made in the beginning of his article. The Swedish botanist's name under which he is now known is Carl Von Linne. The name under which he was born was Carolus Linneus. As Mr. Wood says very correctly, the Swedes in those days very often Latinized their names, especially so among the ministers of the gospel, and as the father, whose name also was Linneus, was a minister, it was not to wonder at that, that his son was baptized to Carolus instead of Carl. Under this name, Carolus Linneus, he became world-famous and went under this name up to the year of 1761, when he was admitted to Knighthood. The letter of patents, if you may call it so, creating him a nobleman antidated to 1757, so this is the turning year between the names Carolus Linneus and Carl Von Linne.

In Mr. Wood's article he mentions " . . . the English method for pronounciation of classical names." I would like to ask Mr. Wood if he would kindly inform me when the "English" method was inaugurated and if this method has been adopted universally. That is—all over the world.

Some years ago I spent a year on the little Island Grand Cayman, B.W.I., where I met an English botanist.—I have forgotten his name,—who was employed in research work for the Royal Botanical Garden in Kingston, Jamaica, B.W.I., and he helped me classify an orchid by the name of Dandrophylax faucettii and he pronounced it in true Latin way.

If the English method is not universal, take for instance Rhinanthus minor pronounced according to this method would not be understood by any European, Japanese or Chinese botanist; neither would the species name "major" and many others likewise.

In the schools and colleges, when teaching Latin, French, German, or any foreign language, I have been informed that they do not teach these languages according to any "English" method. Why then have an "English" method in pronouncing the Latin names of the botanical world, or for that matter any science when Latin names are employed?

Mr. Wood mentioned that the American Ornithologist Union has dropped in most cases the second "i" but failed to mention if this "i" is pronounced according to "English" method or according to Latin pronounciation.

Very correctly Mr. Wood mentions that the Greek language had to be borrowed from in naming quite a few of the plants. But these Grecian derivations are Latinized, that is, both written with Roman letters and pronounced in the Latin language. At least, that is the way I was taught.

I discussed this subject with several people versed in Botany and they have admitted I was correct, but used the "English" method for convenience. I can very well understand the "convenient" part of it as the pronounciation of the alphabet is different in the English and the Latin languages, but this ought not to be the reason for incorrect teaching. According to my idea, when botany is taught, the pronounciation of the Latin alphabet should be taught first of all and when this is accomplished, the pronounciation of the genera and species will be comparatively easy. Am I right or wrong?

If I am right, every one who has botany at heart should consolidate and work to see that the wrong method is corrected both in schools, colleges and in daily use. The members of the Society of which I am the President, are beginners in the botanical science and I try to educate them in the true pronounciation of the Latin names, but if I am wrong, I will abide by the decision and teach them according to the "English-method"—providing this method has been adopted universally.

GUSTAF STARCK.

Replying to Mr. Starck's questions: The "English method" for pronouncing Greek and Latin names is presumably used only in English-speaking countries. I do not know when it was inaugurated. It is true that our schools use the "Roman method" in teaching Latin, thus following the original pronounciation in so far as that is now known; but such has not always been the case, and it is probably due to the earlier custom that the English pronounciation is so generally used in legal phraseology and classical literature, as well as in scientific nomenclature.

The American Ornithologists' Union does not attempt to prescribe any system of pronounciation other than to indicate in its Check List the syllables upon which the accent should fall.

With regard to Linnaeus, Mr. Starck is no doubt much better informed than the present writer, and I may have been in error in assuming that "Linne" represented the original or Swedish form of the family name; however, the point which I was trying to bring out was simply the important place which the Latin language occupied in the science and scholarship of that period.

I fully agree with Mr. Starck that the English pronunciation is not the most desirable for scientific names, though I believe it is possible to overstress the value of world-wide uniformity in this respect, since a foreigner should be able to interpret the Anglicized names as easily as the rest of a conversation in English. As is so often true, this matter is one in which practical considerations must take precedence over theoretical ideals, and it is a question of using the "English method" with some hope of attaining uniformity in English-speaking countries, or of trying to improve on it with the result of increasing the confusion and uncertainty.

No matter what may be taught in the schools, in this country the final arbiters of pronunciation are the recognized dictionaries such as Webster, Century and Standard, and these use the "English method" exclusively. Doubtless it would require united action by all the botanical and zoological organizations to change their policy in regard to scientific names. If such action should be taken, it would still remain to choose a substitute system. The "Continental method," which, according to Webster, is widely used in the Roman Catholic Church, would be in the nature of a compromise as far as English-speaking people are concerned, since the vowels are sounded in the Latin or Italian manner, while the consonants are pronounced according to the custom of the country in which it is being used. If, on the other hand, it should be decided to go back to original pronunciations, I can see no valid reason, now that the Latin language is no longer preeminent in scientific writing, for discriminating against the equally numerous Greek words by compelling them to conform to Latin rules.

ROBERT S. WOODS.

There is no such a thing as a truly spineless cactus. Frequently the young growth has a few spines which disappear later, but they all have a greater or smaller number of the small spicules and more often a few spines as well.

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